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GRAY'S FLORA OF NORTH AMERICA.¹—All botanists will accept with sincere thankfulness this beginning of the new "Flora." A beginning at the middle, indeed, yet not a "beginning of the end;" but so that the work be done the order of its doing may well be left to his choice who is looked upon with one accord as the only one competent for its proper performance. If a preference might be expressed in regard to it, it would doubtless be that Dr. Gray would see fit to give next a revision of what is by far the most intricate and difficult of all the orders of our flora, viz: the *Compositæ*. No portion of the proposed volumes is more needed by botanists or will be more acceptable, and in none is Dr. Gray more truly the sole authority. As he has recently gone over a considerable portion of the ground in his work for the "Botany of California," this would be all the easier for him.

In looking over the present issue, some peculiarities of arrangement at once attract attention. There are no artificial keys either to genera or species. Under each order the ordinal character is followed by a synopsis of the genera, with concise but essentially complete characters, grouped together not only by sub-orders or tribes (where such exist), but also by minor subdivisions, and under characteristic headings, thus avoiding repetition, and leading most directly to the genus sought. When the genus itself is taken up, only such other details, general remarks and synonymy are given as may be needed to fully supplement the previous description. A comparison with the published volumes of "Torrey and Gray's Flora" will make the improvement of plan manifest, and show the appropriateness of the title which Dr. Gray has adopted. The same synoptical method, however, is not carried out in the treatment of species, though they are similarly grouped under common headings so far as they have essential characters in common. The specific descriptions themselves are full, but without redundancy or needless repetition. Of their technical accuracy and finish it is unnecessary to speak. It may perhaps be questioned whether it would not have been well, at least in the larger genera, to have subjected the species to the same process as the genera themselves. One would imagine that what is best in the one case should be best in the other also. Experience in the use of the book should determine. As compared with the "Manual" the descriptions are much fuller, and yet, even with the additional synonyms, etc., the species occupy on the average but little more space. A synoptical key to the orders has been omitted, doubtless because it will come more properly in the first volume at the beginning of the *Gamopetalæ*, of which we have here only the concluding portion.

¹*Synoptical Flora of North America.* By ASA GRAY, LL.D., F.M.R.S. and L.S. Lond., R.I.A., Roy. Soc. Upsala, Stockholm, Göttingen; Roy. Acad. Sci. Munich, Berlin, etc.; Corresp. Imp. Acad. Sci. St. Petersburg, etc.; Fisher Professor of Natural History (Botany) in Harvard University. Vol. ii, Part i. *Gamopetalæ* after *Compositæ*. New York, Iverson, Blakeman, Taylor & Co. London, Trübner & Co., Ludgate Hill. Leipzig, T. O. Weigel. May, 1878.

Much care has evidently been taken in the selection of the type used for different purposes, and in the general "get up" of the book. It is a satisfaction to see that Dr. Gray has not countenanced, in the writing of botanical names, the methods of punctuation and the disuse of capital letters so generally favored by American zoölogists and entomologists, and which some would force upon our botanists. Whatever may be the rules of punctuation in Latin or in the Continental languages, in the use of the English language the same principles should apply in writing upon botany as upon other subjects. In general, thus far, this has been the case. English-writing botanists, and most English Latin-writing botanists, as well, have been united in their adhesion to English customs in this matter, and it is to be hoped that they will so remain.

The portion of the gamopetalous flora here described includes 1560 native species, belonging to 298 genera. The introduced plants add twenty-six genera and ninety-six species. A comparison with the number of species native to the region covered by the "Manual" (as given in the second edition) makes the probable entire number of phenogamous species in North America to lie between nine and ten thousand. The same conclusion is deduced from the number of polypetalous species as enumerated in the "Bibliographical Index." The mean result from the two comparisons is 9,378 species, so that 10,000 is very probably a closely approximate limit. Of the 298 genera, 120 have only a single species each. By far the most important order is that of the *Scrophulariaceæ*, containing 38 genera and 315 species, the next in order being the *Labiataæ*, with 37 genera, but only 189 species. These orders, with the *Ericaceæ*, *Borraginaceæ*, *Hydrophyllaceæ* and *Polemoniaceæ*, include nearly half of the genera and over three-fifths of the species. The largest genera are *Pentstemon* with 71, *Gilia* with 70, and *Phacelia* with 56 species.

As regards the distribution of this flora, it appears from a very cursory examination that it divides readily into an eastern, a central and a western section. The first may be considered as covered essentially by Gray's Manual and Chapman's Flora, and the last in good degree by the Botany of California. Taking these as a guide, and making to each the additions indicated by the present "Flora," it is found that the eastern division includes 610 native species, of which 130 are peculiar to the Manual, 205 to Chapman's Flora, and 275 common to both. The Botany of California includes 567 species, of which 58 belong also to the Atlantic States. Of the remaining 450 species, 48 are high northern and do not enter the United States, 8 are Mexican and not yet found within our limits, 290 are mainly southern, belonging to the warmer and dryer interior, and 103 are found only in the Rocky Mountains or the cooler region westward to Oregon. Had Greenland been included in the limits adopted by Dr. Gray,

only two other species (*Veronica fruticulosa* and *Gentiana nivalis*) would have been added, and of these the latter is reported from Labrador.

Numerous additions and changes of nomenclature are made in the several sectional floras above mentioned—some of them new, many to be found in previous publications. About 40 species are added to the flora of the southern Atlantic States, chiefly from Florida, and nearly 50 species to the flora of California. The changes to be noted in the flora of the Northern States as given in Gray's Manual (edition of 1868) are less numerous, but some of them are of moment. The following list includes all of the more important:

Phyllodoce taxifolia is referred, with the other species of the genus, to *Bryanthus*—becoming *B. taxifolius*, Gray.

The species of *Azalea* are referred to *Rhododendron*, as was done by Dr. Torrey over fifty years ago, to whom the species are credited. *Rhodora Canadensis* also becomes *Rhododendron Rhodora* of Gmelin (Syst. i. 694, 1796), instead of Don as stated.

The order *Aquifoliaceæ* is excluded as belonging rather to the polypetalous division. This is likewise the case with the closely allied southern order *Cyrilleæ*.

The name *Plantago Rugelii*, Decaisne, is restored for the plant which is referred in the Manual to *P. Kamtschatica*. *P. decipiens*, Barneoud, is also substituted for *P. maritima*, var. *juncoides*, which latter species is not found in the Atlantic States.

The genus *Steironema*, Raf., is restored for the section of that name under *Lysimachia*.

Utricularia striata, LeConte, is referred to *U. fibrosa*, Walter. The questionable species mentioned in the Manual at the end of the genus is made Var. *cleistogama* of *U. subulata*.

Phelipæa Ludoviciana becomes *Aphyllon Ludovicianum*, Gray.

Chelone obliqua, Linn., is added—a bright rose-colored species, ranging from Illinois and Virginia to Florida.

Pentstemon digitalis becomes *P. lævigatus*, Solander.

Gerardia integrifolia, Gray, is *G. lævigata*, Raf., and *G. setacea* (not Walt.) is *G. Skinneriana*, Wood.

Bartsia Odontites, Huds., is added as sparingly naturalized on our northern coast.

The varieties of *Lycopus Europæus* are established as species, viz: *L. sessilifolius*, Gray, *L. rubellus*, Moench, and *L. sinuatus*, Ell. *Pycnanthemum pilosum* is made a variety of *P. nuticum*.

Calamintha Nuttallii, Benth., is restored.

Monarda clinopodia, Linn., is added, intermediate between *M. didyma* and *M. fistulosa*; also *Physostegia intermedia*, Gray, of Western Kentucky and south-westward.

Stachys aspera, Michx., and *S. cordata*, Riddell, are restored for varieties of *S. palustris*, the var. *glabra* being referred to the former.

Onosmodium molle is made a variety of *O. Carolinianum*.

Lithospermum longiflorum is referred to *L. angustifolium*.

Myosotis palustris, var. *laxa*, becomes *M. laxa*, Lehm.

Cynoglossum Morisoni is transferred to *Echinospermum* as *E. Virginicum*, Lehm.

Heliotropium tenellum, Torr., is to be added as found in Kentucky.

Ellisia ambigua is reduced to a form of *E. Nyctelea*.

Phlox ovata, Linn., is restored for the broad-leaved form of *P. Carolina*, while var. *nitida* is referred to *P. glaberrima*, var. *suffruticosa*, Gray. *P. amœna*, Sims, is substituted for *P. procumbens* (not Lehm.), and *P. Stellaria*, Gray, is added.

Diapensia and *Pyxidanthera* are united with *Galax* and the southern genus *Shortia* to form the order *Diapensiaceæ*.

Calystegia is returned to *Convolvulus*, where our species were originally placed by Linnæus.

The species referred in the Manual to *Bonamia* are transferred (following Benth. & Hook.) to *Breweria*, R. Br., as distinguished from *Bonamia*, Thouars, by the plicate corolla. It is perhaps through oversight that the species are not credited to Benth. & Hook., who refer to the Manual for the three known North American species.

The perennial forms of *Physalis* are referred to *P. Virginica*, Mill., instead of to *P. viscosa*, Linn., and to *P. lanceolata*, Michx., in place of *P. Pennsylvanica*, Linn.

Gentiana detonsa becomes *G. serrata*, Gunner, and var. *linearis* of *G. Saponaria* is kept distinct as *G. linearis*, Fries. The recent discovery of *G. amarella*, var. *acuta*, in Vermont should be noted.

Forsteronia difformis is transferred, with some doubt, to *Trachelospermum*, Lemaire, a genus of Eastern Asia.

Acerates paniculata is referred to *Asclepiodora*, a genus proposed by Dr. Gray for all the later species of *Anantherix*, Nutt., which is restricted to the single species upon which it was founded.

Ligustrum vulgare is inadvertently omitted.

Olea Americana is separated from *Olea*, Tourn., by Benth. and Hook., and carried to the Chinese genus *Osmanthus*, Lour.—*Sereno Watson*.

GRABER'S INSECTS.¹—The author of this work is Professor of Zoölogy, at the University of Czernowitz, Austria, and is well and most favorably known by his beautiful and elaborate histological researches on the organs of hearing in insects, and other points in their minute anatomy, especially of the digestive canal of orthoptera, &c. The popular work on insects is a comprehensive and original treatise on their anatomy, general and minute, physiology and biology. The illustrations are new and

¹ *Die Naturkräfte*. Eine naturwissenschaftliche Volksbibliothek, xxi, xxii, Band. Hälfte i. Die Insekten, Von DR. VITUS GRABER. München, 1877, 12 mo. pp. 403, 261.